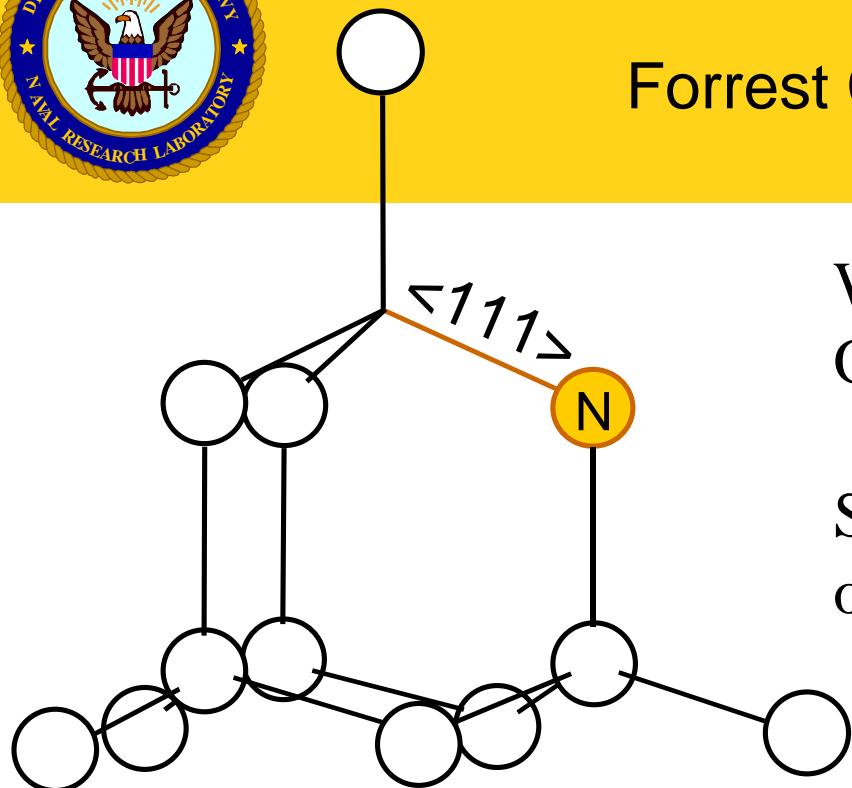


High-field optically detected magnetic resonance of nitrogen-vacancy centers in diamond



Naval Research Lab
Forrest Charnock & Tom Kennedy

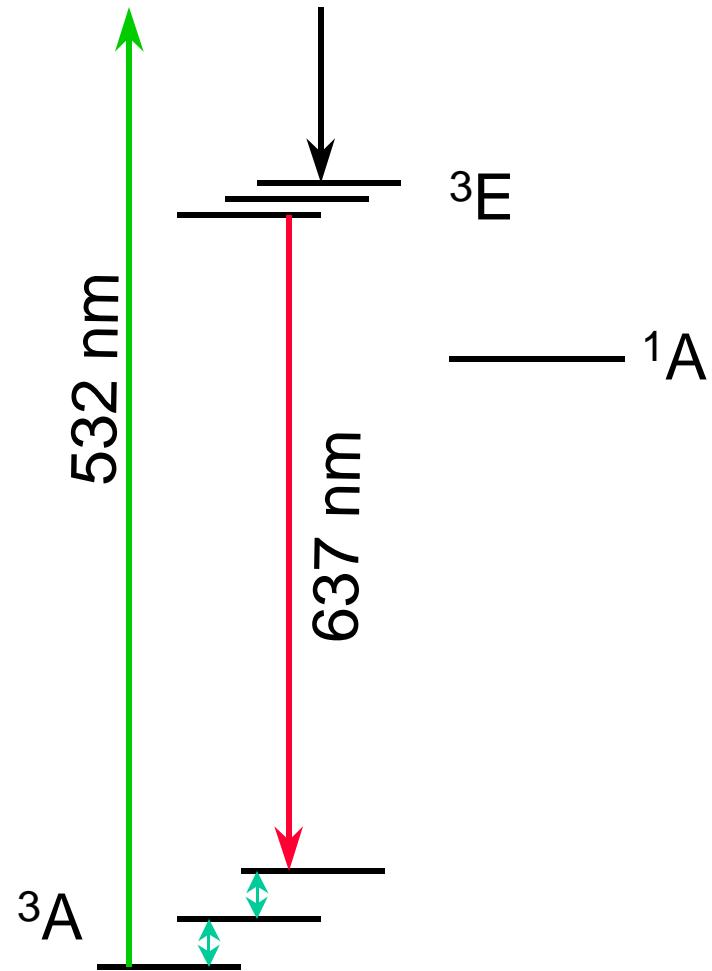


Work supported by the
Office of Naval Research

Sample courtesy of Steve Rand
of the University of Michigan

Optical pumping creates a spin polarized population in the 3A ground state.

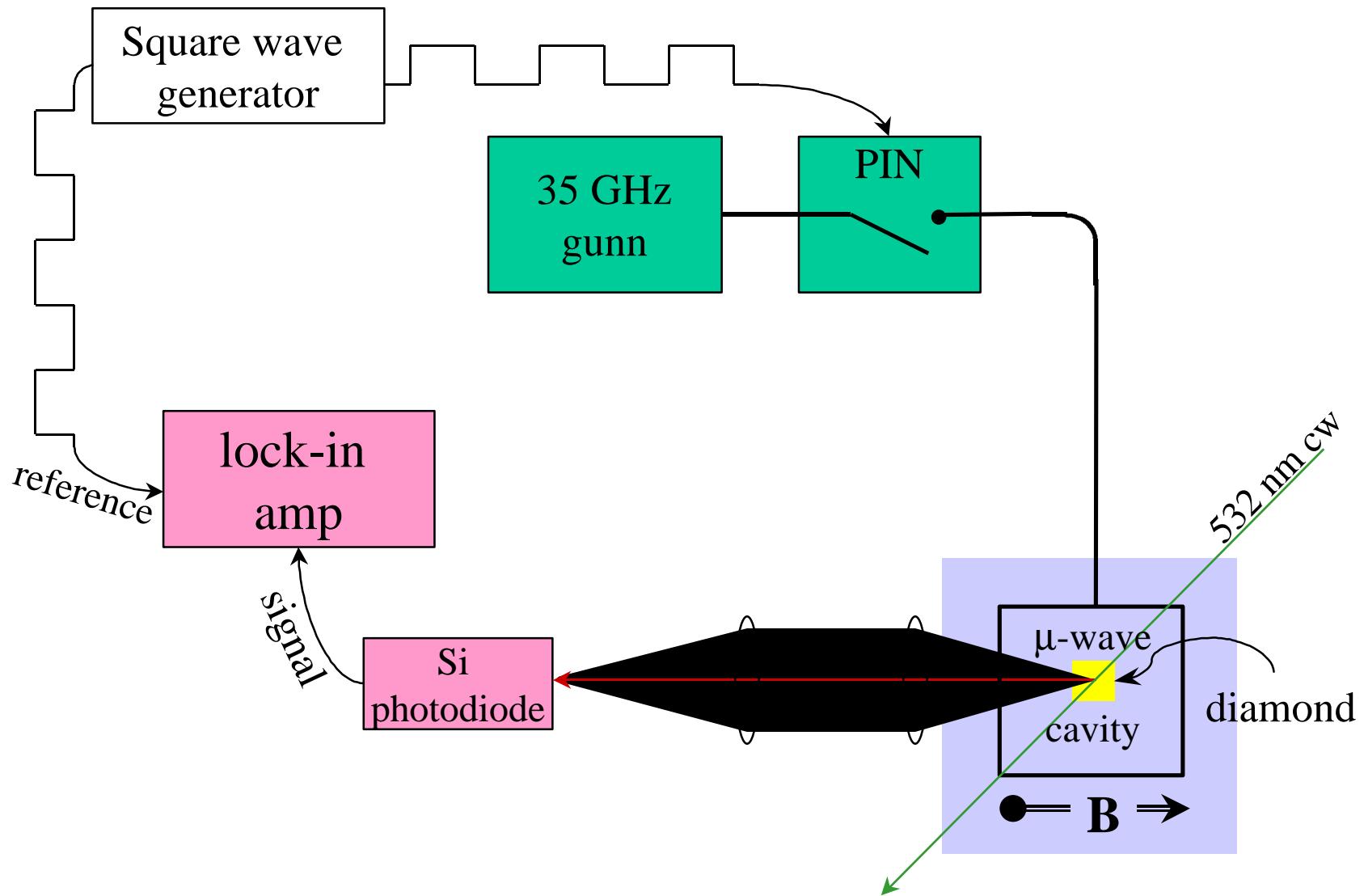
Resonant microwaves tend to equalize the population among the different spin states.



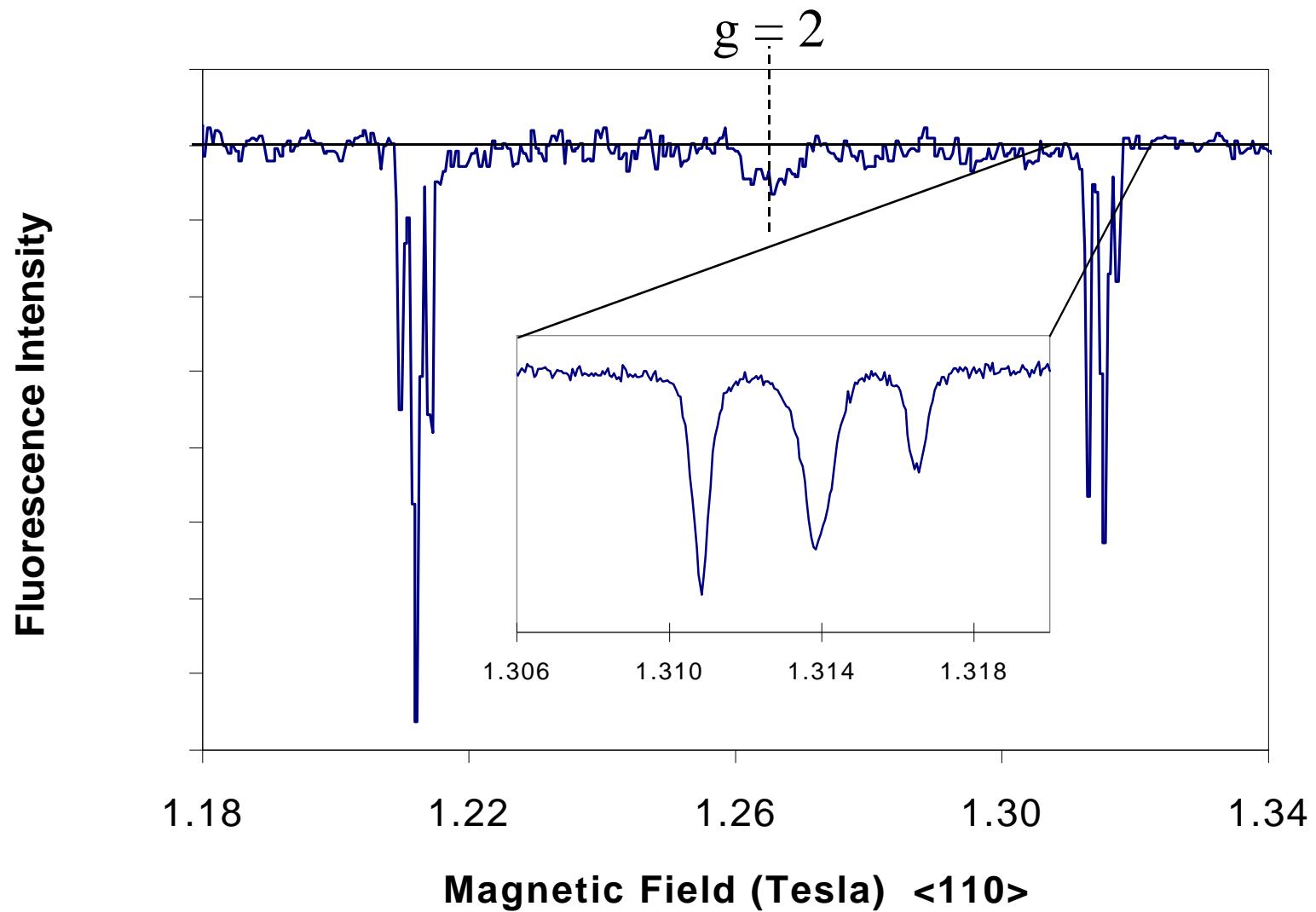
Ambition: study electron spin coherence in solid state materials

- Focused on spins in the 3A ground state of the N-V center
- Performed optically detected magnetic resonance (ODMR) at 35 GHz
- Developed an optically detected electron spin echo (ODESE) spectrometer at 35 GHz

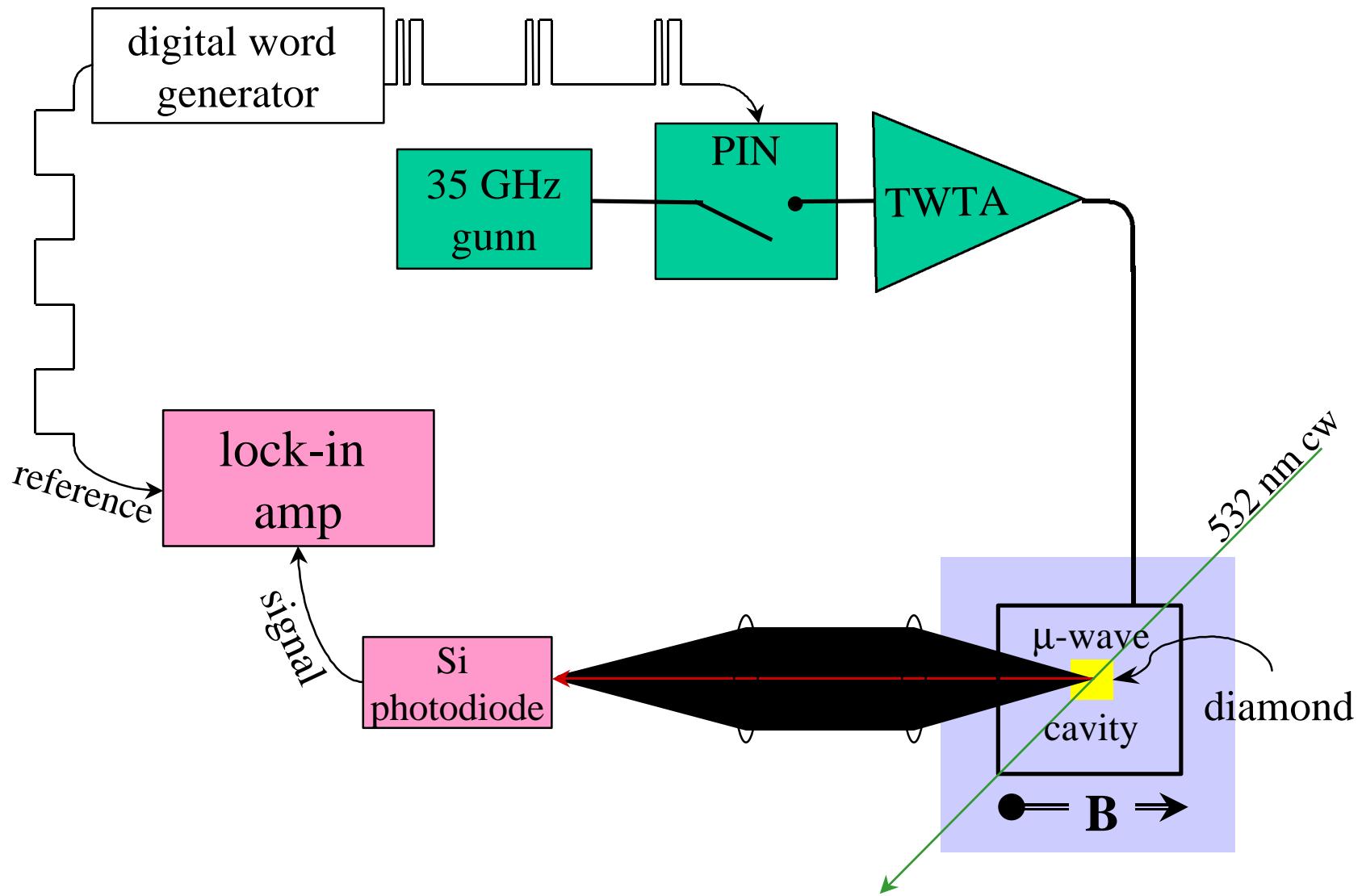
ODMR Spectrometer



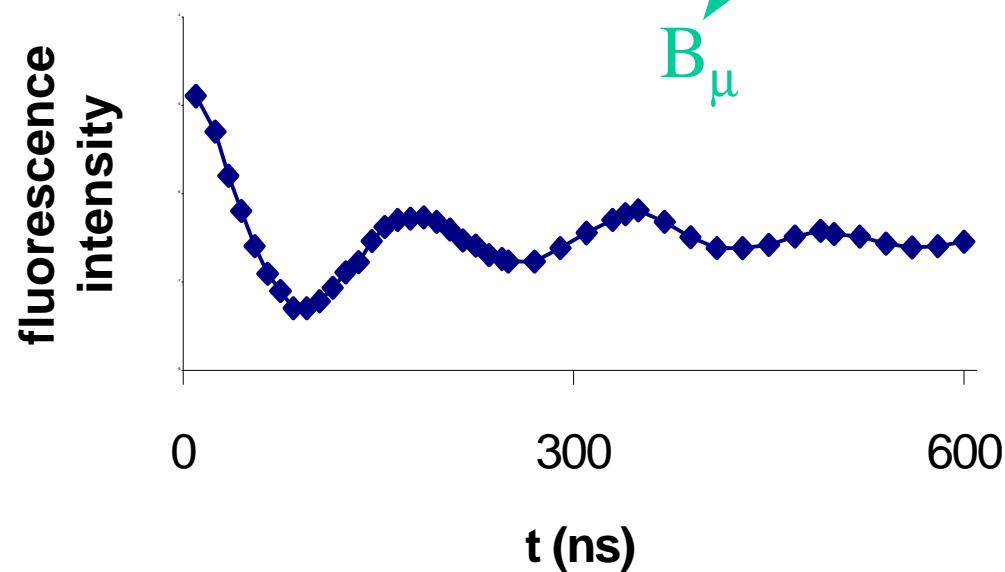
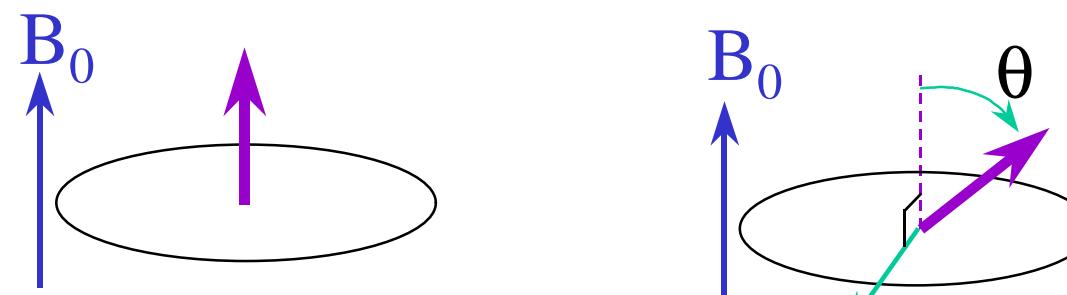
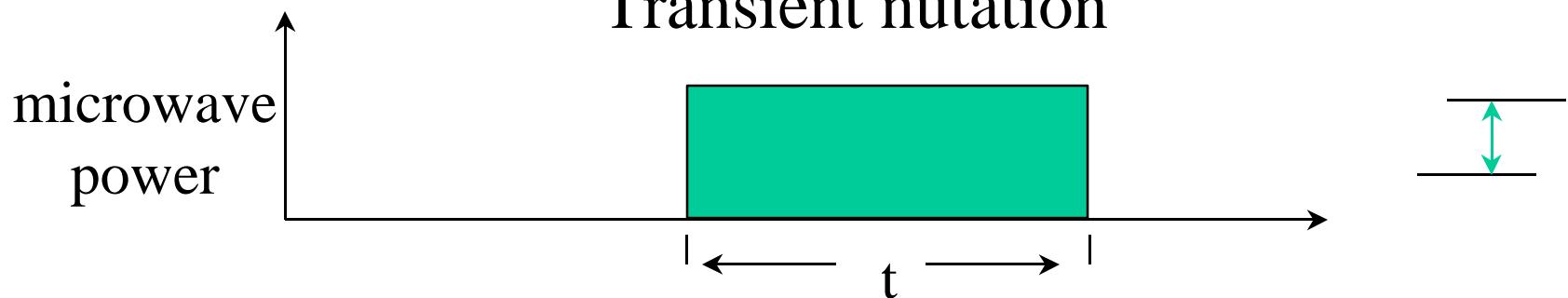
ODMR of N-V centers in diamond, 35 GHz



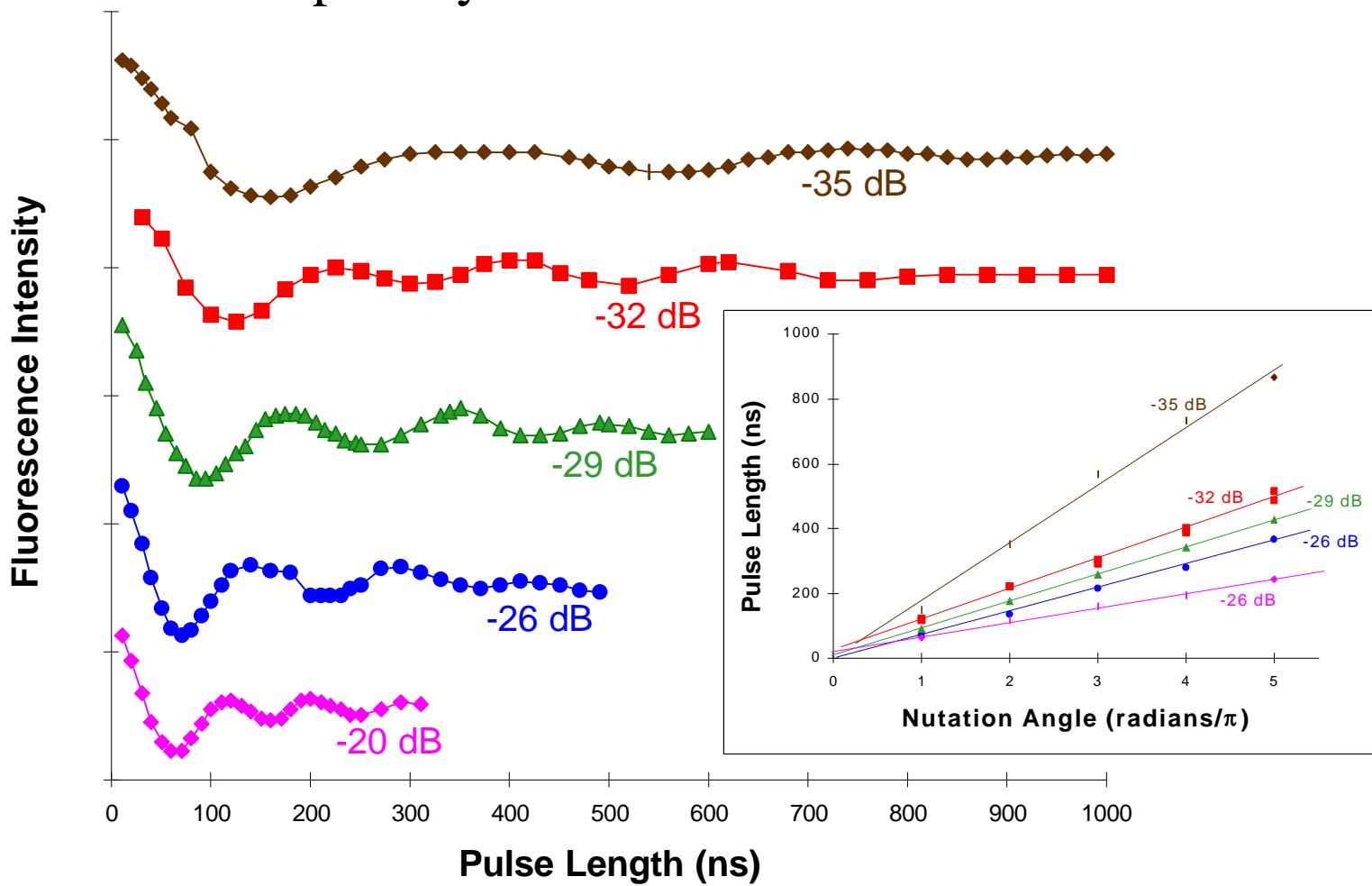
ODESE Spectrometer



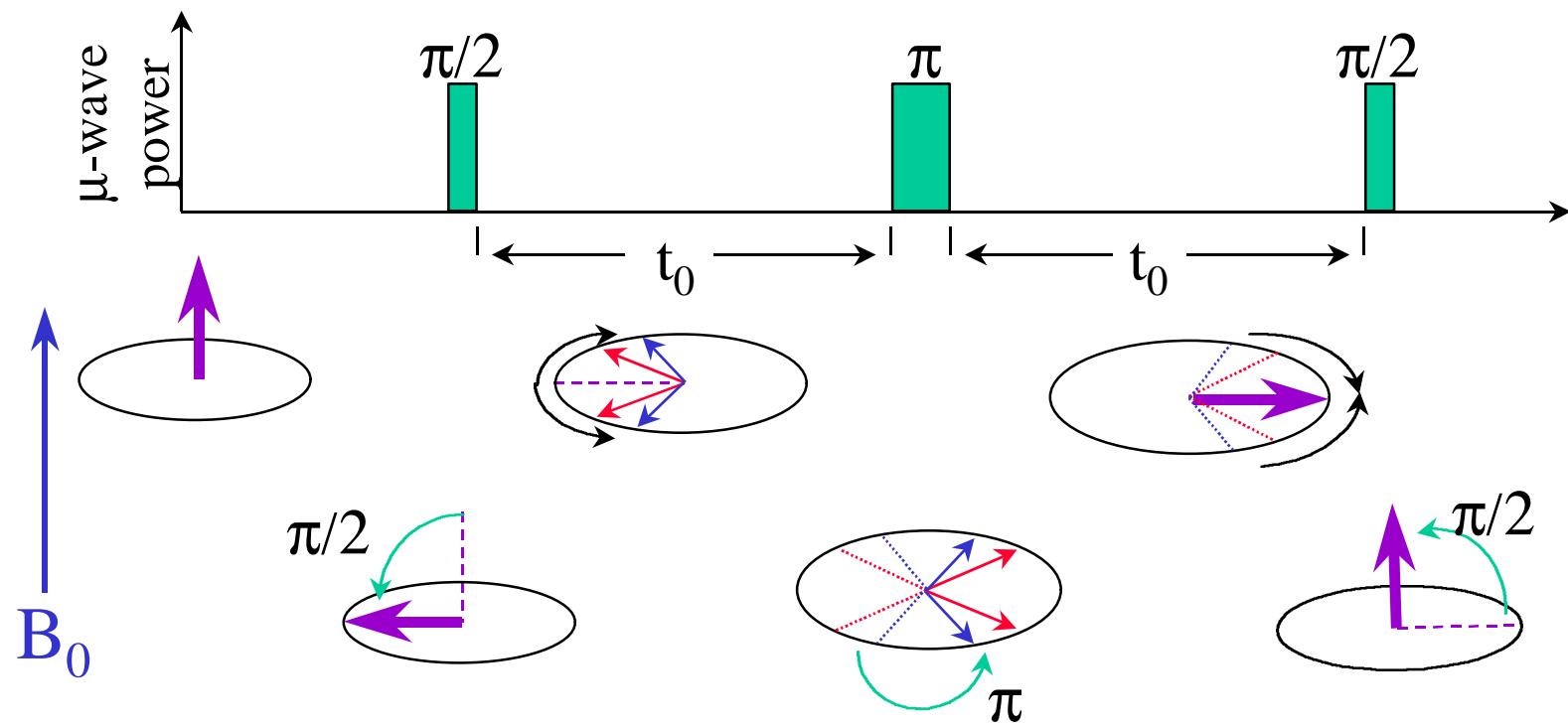
Transient nutation



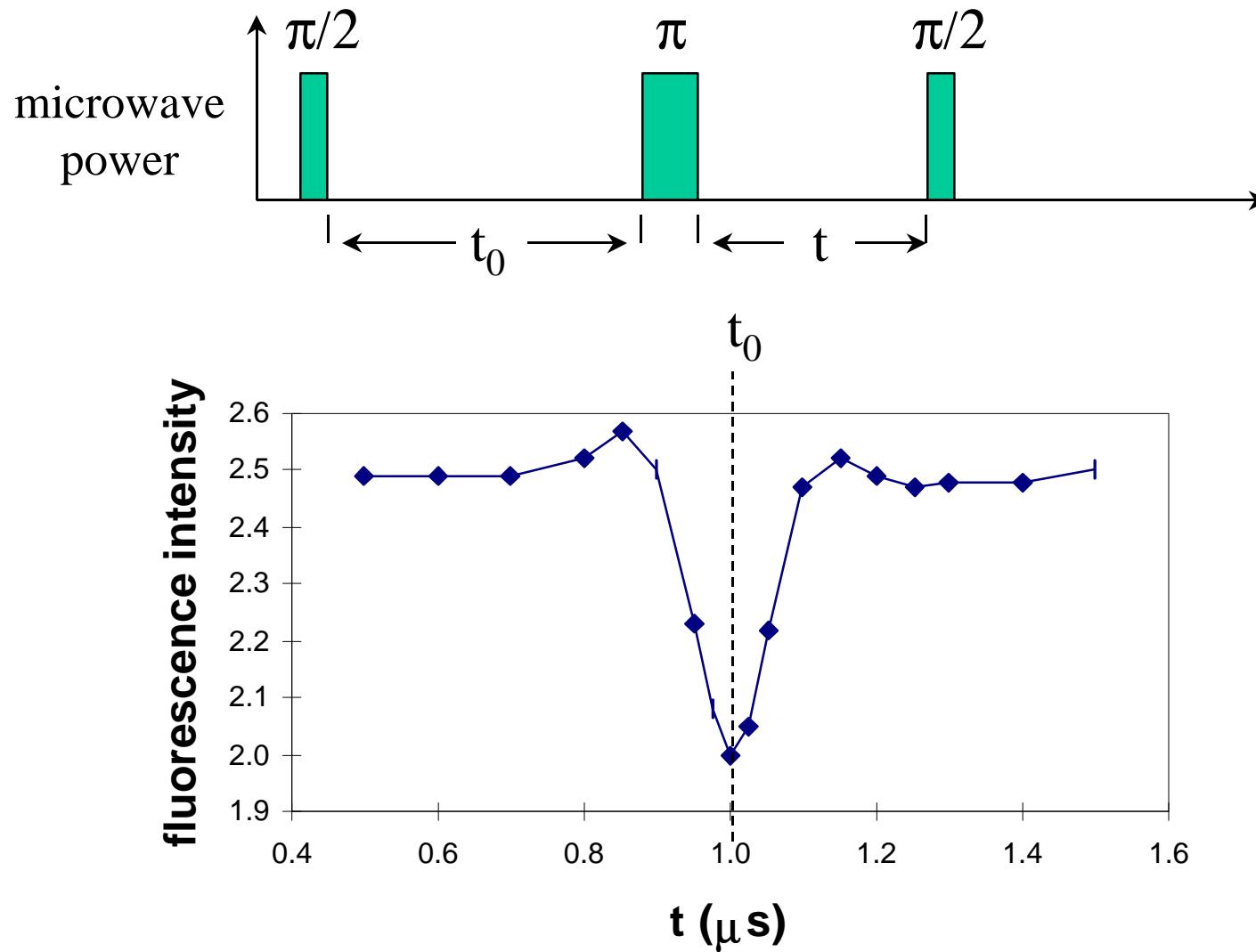
Optically detected transient nutation



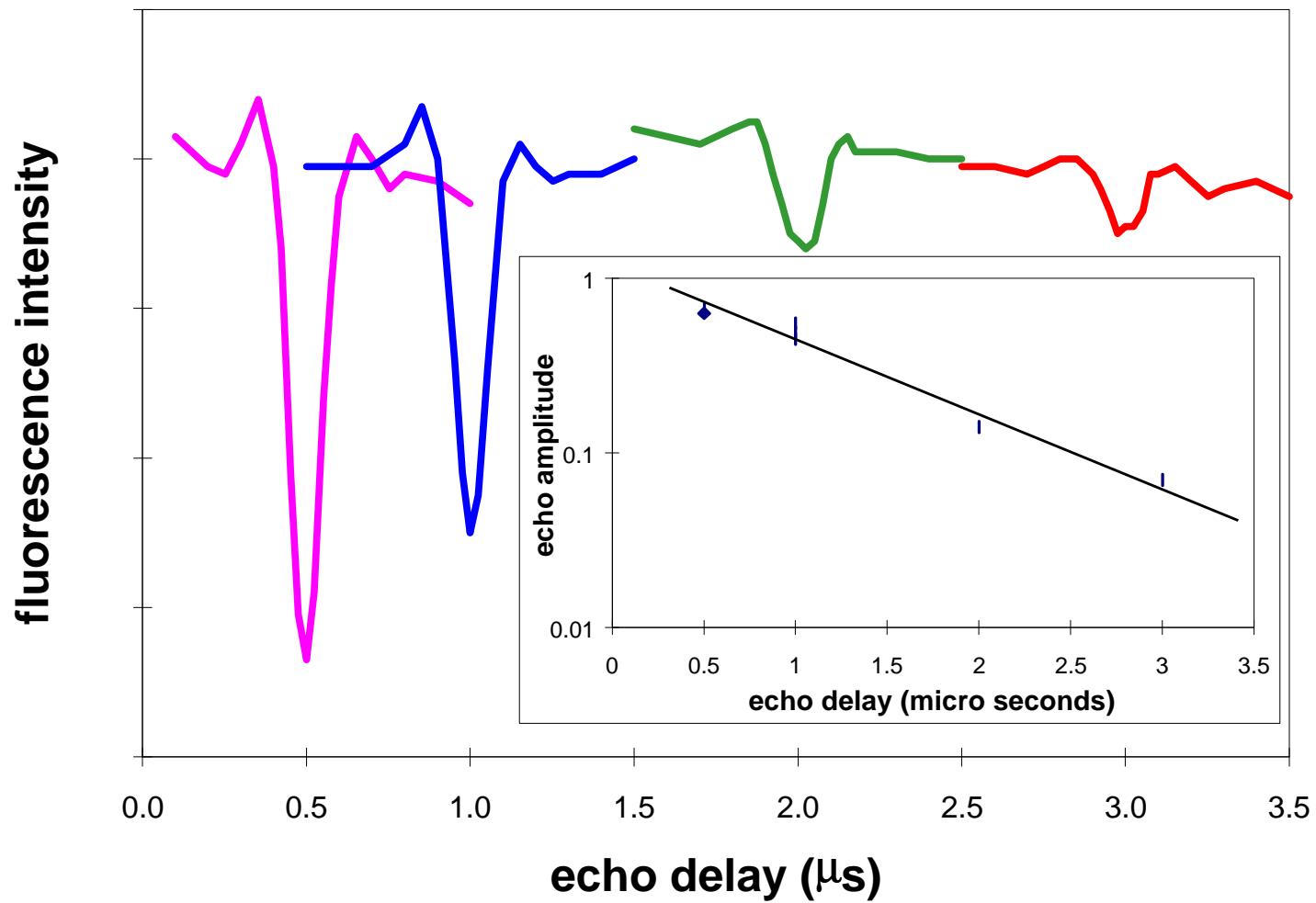
Spin Echo Sequence



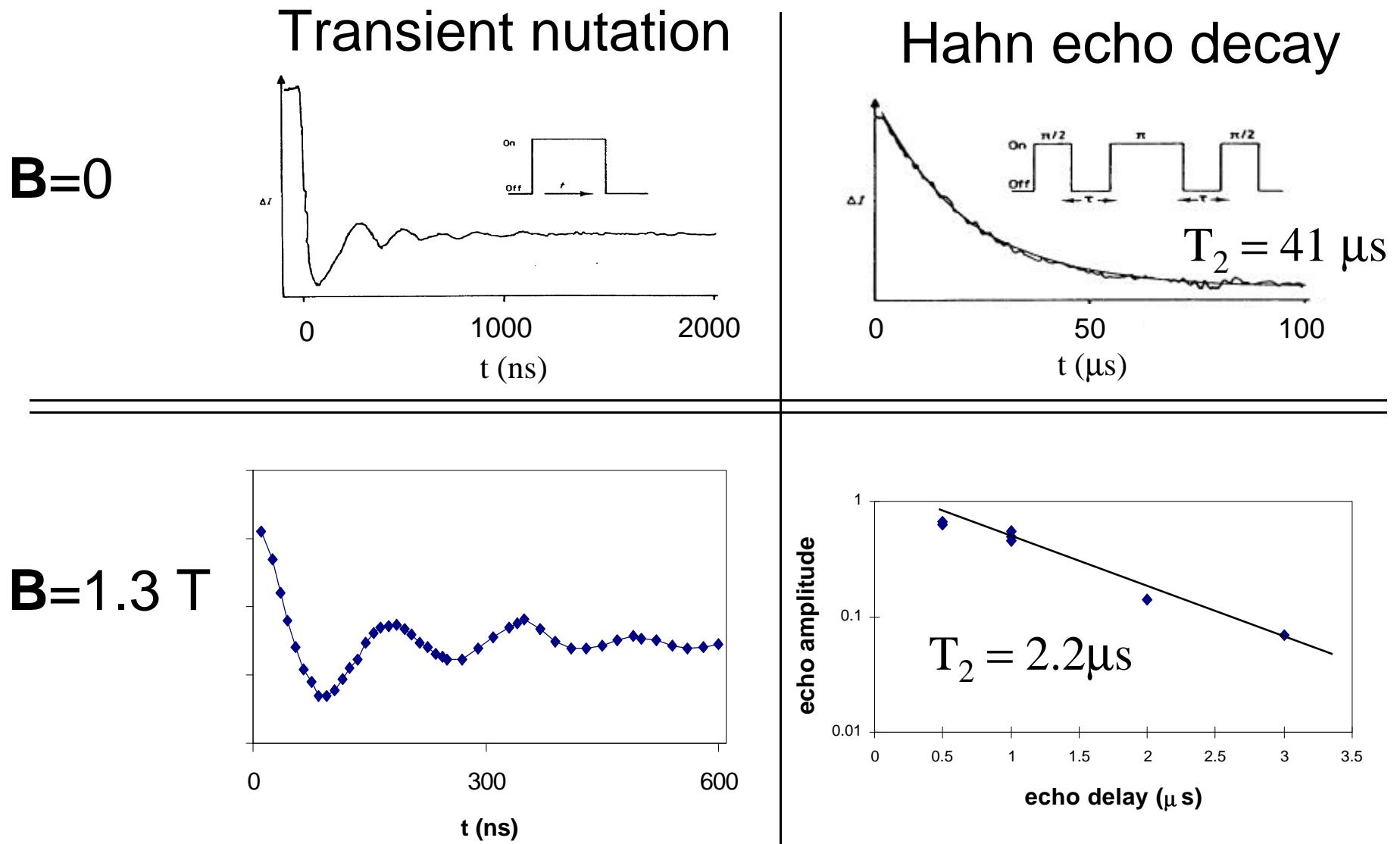
Spin Echo Sequence



Spin echos with different initial delays



Comparison with van Oort, *et al.*



We have measured spin parameters of the N-V center in diamond with optically detected magnetic resonance (ODMR and ODESE).

To do:

- Refine our ODESE spectrometer and methods
- Improve our measurements of the N-V center
- Look at epitaxial materials such as ZnSe/ZnCdSe and AlAs/AlSb



charnock@bloch.nrl.navy.mil